

850M
Tier 4B (final)
Crawler Dozer
PIN NGC103138 and above

SERVICE MANUAL

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1st edition English
January 2017





SERVICE MANUAL

850M Long Track (LT) - Tier 4B (final) [NGC103138 -]
850M Wide Track (WT) / Low Ground Pressure (LGP) - Tier 4B (final)
[NGC103138 -]

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INTRODUCTION

Foreword - Important notice regarding equipment servicing

850M

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All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your CASE CONSTRUCTION Sales and Service Networks.

Safety rules

850M

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Personal safety





This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: Notice indicates a situation that, if not avoided, could result in machine or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: Note indicates additional information that clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules - Personal safety

850M

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General safety rules

Use caution when you operate the machine on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches and embankments or uneven surfaces.

Never permit anyone other than the operator to ride on the machine.

Never operate the machine under the influence of alcohol or drugs, or while you are otherwise impaired.

When digging or using ground-engaging attachments, be aware of buried cables. Contact local utilities to determine the locations of services.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop the engine, remove the key, and relieve the pressure before you connect or disconnect fluid lines.
- Make sure that all components are in good condition. Tighten all connections before you start the engine or pressurize the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while it is being operated or while components are in motion.

Make sure that all guards and shields are in good condition and properly installed before you operate the machine. Never operate the machine with shields removed. Always close access doors or panels before you operate the machine.

Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

Never operate the engine in enclosed spaces as harmful exhaust gases may build up.

Before you start the machine, be sure that all controls are in neutral or park lock position.

Start the engine only from the operator's seat. If you bypass the safety start switch, the engine can start with the transmission in gear. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, and all lighting clean to provide the best possible visibility while you operate the machine.

Operate controls only when seated in the operator's seat, except for those controls expressly intended for use from other locations.

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Put all controls in neutral or park lock position.
3. Engage the parking brake. Use wheel chocks if required.
4. Lower all hydraulic equipment — Implements, header, etc.
5. Turn off the engine and remove the key.

When, due to exceptional circumstances, you would decide to keep the engine running after you leave the operator's station, then you must follow these precautions:

1. Bring the engine to low idle speed.
2. Disengage all drive systems.

3. **▲ WARNING**

**Some components may continue to run down after you disengage drive systems.
Make sure all drive systems are fully disengaged.
Failure to comply could result in death or serious injury.**

W0113A

Shift the transmission into neutral.

4. Apply the parking brake.

▲ General maintenance safety ▲

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling systems operate under pressure. Hot coolant can spray out if you remove a cap while the system is hot. Allow the system to cool before you remove the cap. When you remove the cap, turn it slowly to allow pressure to escape before you completely remove the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before you weld on the machine. Always wash your hands after you handle battery components.

Fire and explosion prevention

Fuel or oil that is leaked or spilled on hot surfaces or electrical components can cause a fire.

Crop materials, trash, debris, bird nests, or flammable material can ignite on hot surfaces.

Always have a fire extinguisher on or near the machine.

Make sure that the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.

At least once each day and at the end of the day, remove all trash and debris from the machine especially around hot components such as the engine, transmission, exhaust, battery, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

At least once each day, remove debris accumulation around moving components such as bearings, pulleys, belts, gears, cleaning fans, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

Inspect the electrical system for loose connections and frayed insulation. Repair or replace loose or damaged parts.

Do not store oily rags or other flammable material on the machine.

Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvents before welding or flame-cutting.

Do not expose the machine to flames, burning brush, or explosives.

Promptly investigate any unusual smells or odors that may occur during operation of the machine.

General battery safety

Always wear eye protection when you work with batteries.

Do not create sparks or have open flame near a battery.

Ventilate the area when you charge a battery or use a battery in an enclosed area.

Disconnect the negative (-) terminal first and reconnect the negative (-) terminal last.

When you weld on the machine, disconnect both terminals of the battery.

Do not weld, grind, or smoke near a battery.

When you use auxiliary batteries or connect jumper cables to start the engine, use the procedure shown in the operator's manual. Do not short across terminals.

Follow the manufacturer's instructions when you store and handle batteries.

Battery post, terminals, and related accessories contain lead and lead compounds. Wash hands after handling. This is a California Proposition 65 warning.

Battery acid causes burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.

Keep out of reach of children and other unauthorized persons.



SERVICE MANUAL

Engine

**850M Long Track (LT) - Tier 4B (final) [NGC103138 -]
850M Wide Track (WT) / Low Ground Pressure (LGP) - Tier 4B (final)
[NGC103138 -]**

Engine - Remove

850M

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⚠ DANGER

Heavy objects!

Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply will result in death or serious injury.

D0076A

⚠ WARNING

Heavy object!

ALWAYS use a hoist or get assistance to lift the component. Failure to comply could result in death or serious injury.

W0086A

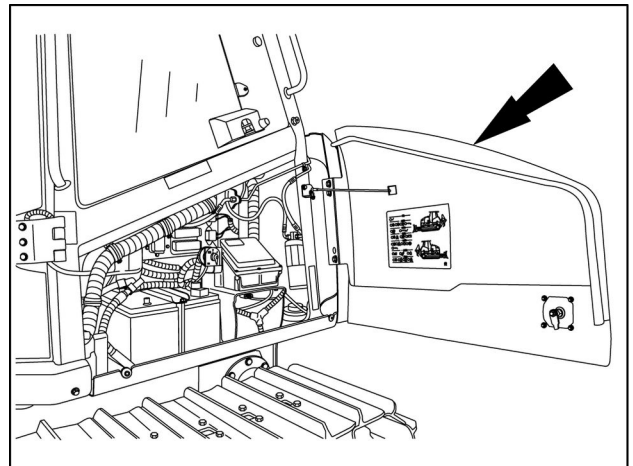
⚠ WARNING

Heavy object!

ALWAYS use adequate lifting equipment (heavy-duty hoist, loader, or forklift) to lift the component. Failure to comply could result in death or serious injury.

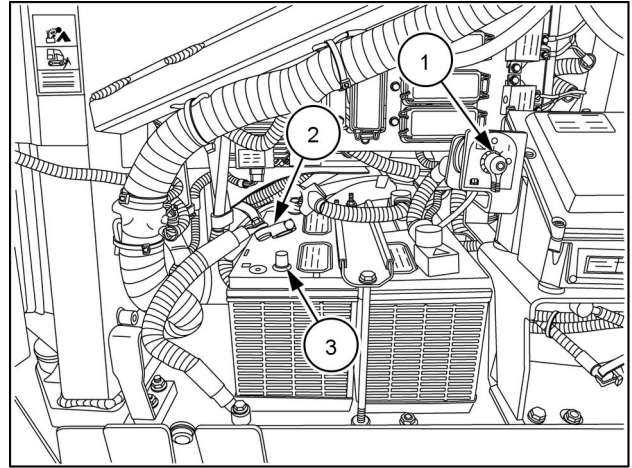
W0101A

1. Park machine on a firm, level surface.
2. Lower all equipment to the ground.
3. Engage parking brake and shut engine off.
4. Relieve system of hydraulic pressure by actuating all hydraulic functions. Remove key when complete.
5. Open battery access door.



RAIL13DOZ1352AA 1

6. Turn master battery disconnect switch (1) to the OFF position.

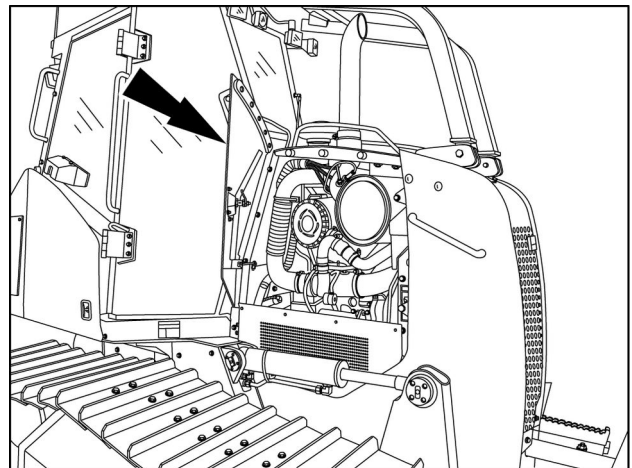


RAIL13DOZ1453AA 2

7. Disconnect negative (—) battery cable (2) from battery negative terminal (3).

8. Open right and left engine access doors.

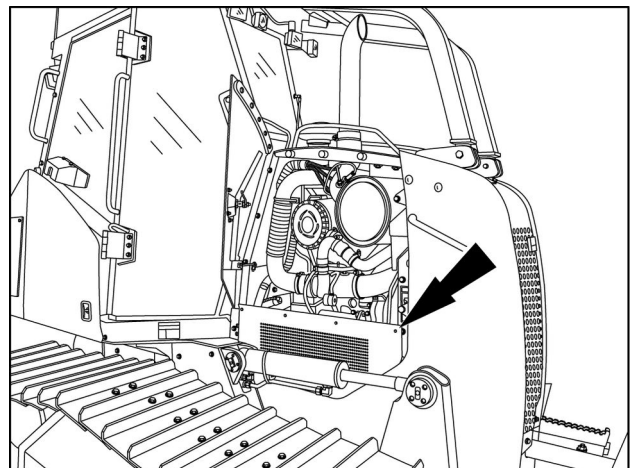
NOTE: The right engine access door is shown. The left door is similar.



RAIL13DOZ1400AA 3

9. Remove right and left lower engine access panels from the machine.

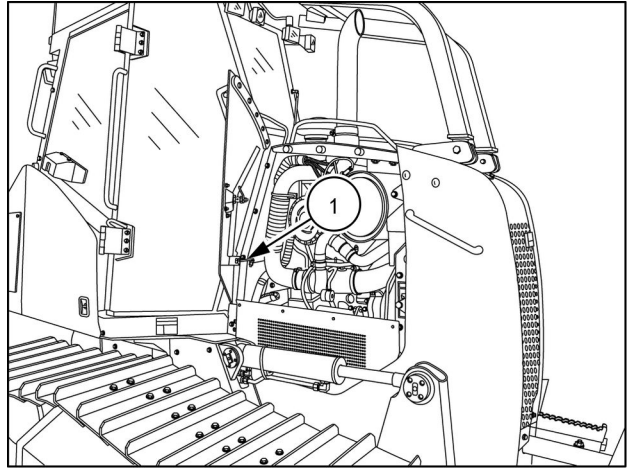
NOTE: The right lower engine access panel is shown. The left access panel is similar.



RAIL13DOZ1400AA 4

10. Remove right and left engine access door prop rods (1) from the chassis mount, and remove the engine access door.

NOTE: The right engine access door is shown. The left door is similar.

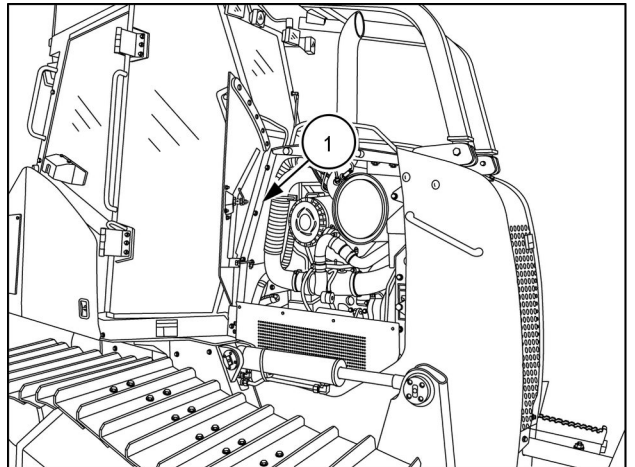


RAIL13DOZ1400AA 5

NOTICE: Engine access doors weigh approximately 45 kg (100 lb) each. Use caution when removing to prevent personal injury or property damage.

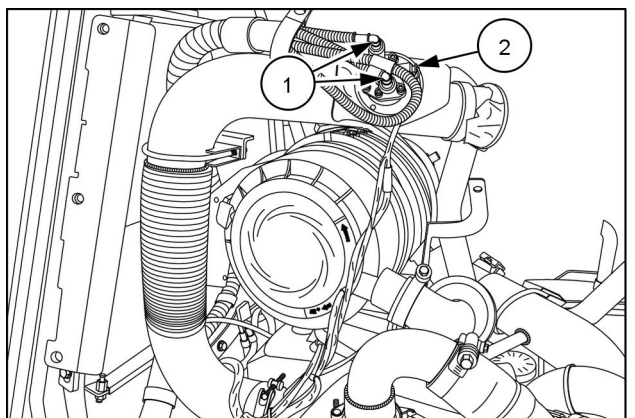
11. With the aid of a helper, remove three mounting bolts and washers from the right and left engine access door hinges (1), and remove right and left side engine access doors.

NOTE: The right engine access door is shown. The left door is similar.



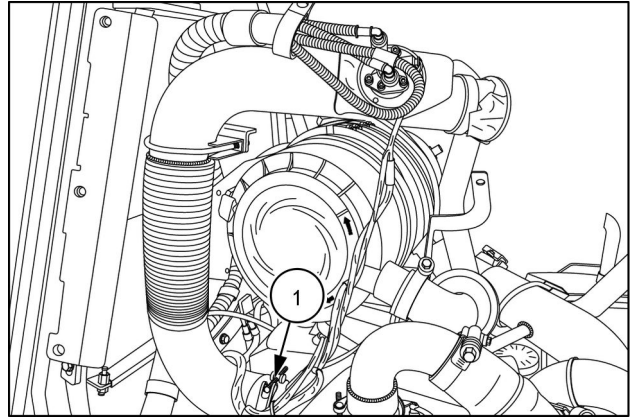
RAIL13DOZ1400AA 6

12. Remove hood and SCR unit as an assembly. refer to **Hood - Remove (90.100)**.
13. Disconnect DEF injection lines (1) and electrical connector (2) from the DEF injection unit. Cap and plug all openings to prevent fluid loss or contamination.



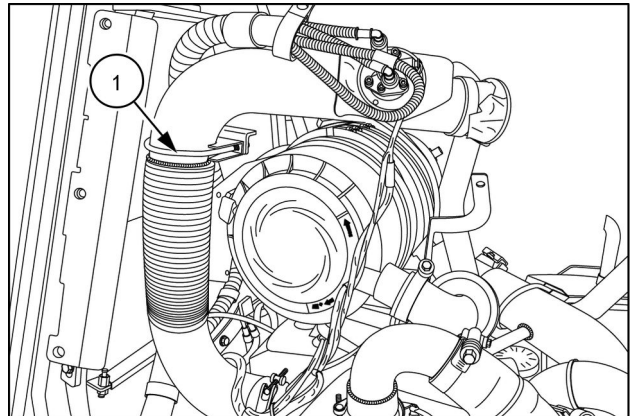
RAIL13DOZ1683AA 7

14. Remove the exhaust pipe-to-turbocharger retaining clamp (1).



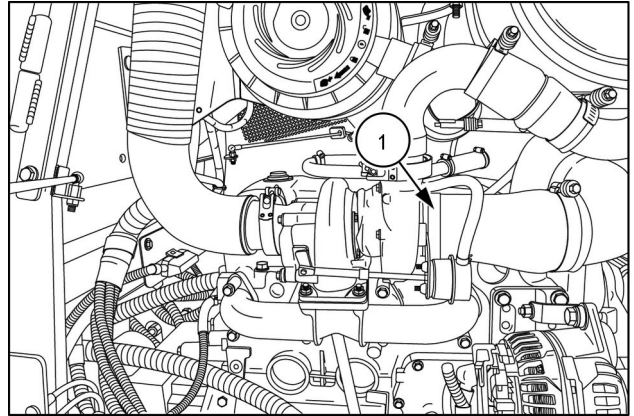
RAIL13DOZ1683AA 8

15. Remove exhaust pipe-to-bulkhead retaining clamp (1) and remove the exhaust pipe from the machine. Cap and plug all openings.



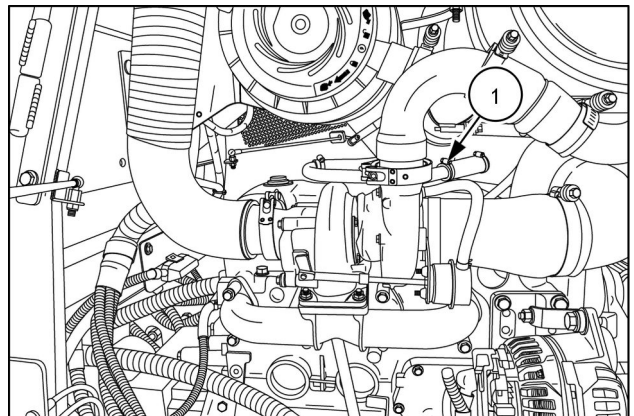
RAIL13DOZ1683AA 9

16. Loosen the air cleaner tube hose clamp (1) at the turbocharger inlet.



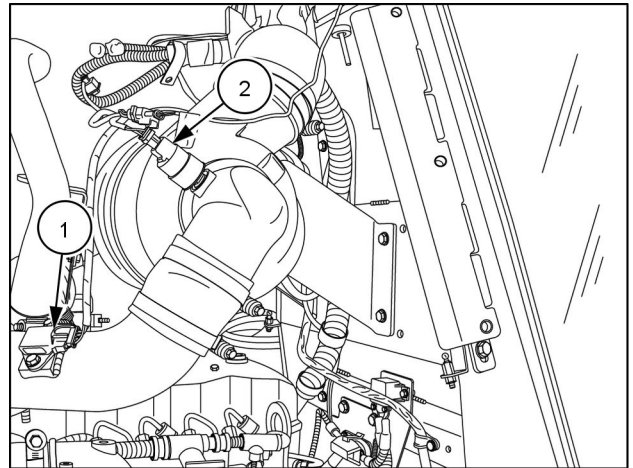
RAIL13DOZ1680AA 10

17. Loosen blow by tube hose clamp at air cleaner tube.



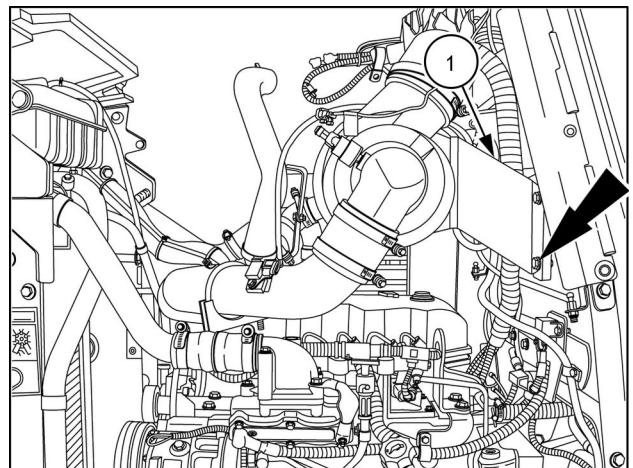
RAIL13DOZ1680AA 11

18. Disconnect mass air sensor electrical connector **(1)** and air filter restriction sensor **(2)** from the air cleaner to turbocharger tube.



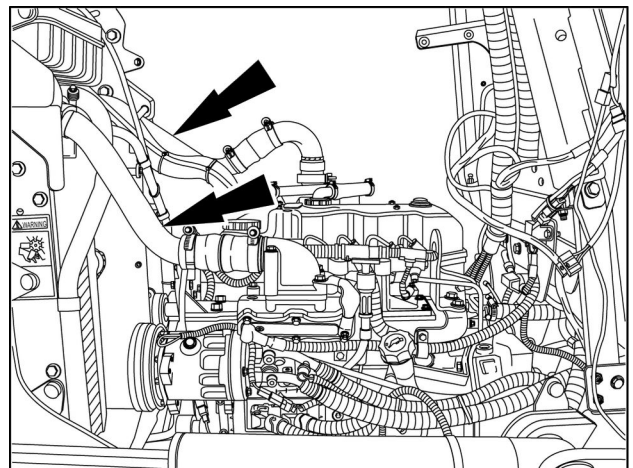
RAIL13DOZ1681AA 12

19. Remove four air cleaner mounting bolts and washers from air cleaner mounting bracket **(1)**. Remove the air cleaner as an assembly from the machine. Cap and plug all openings.



RAIL13DOZ1320AA 13

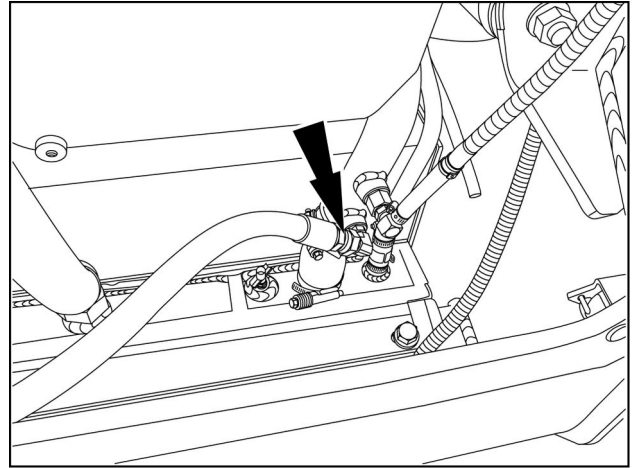
20. Loosen four charge air cooler hose clamps. Remove both charge air cooler pipes from the machine. Cap and plug all openings.



RAIL13DOZ1321AA 14

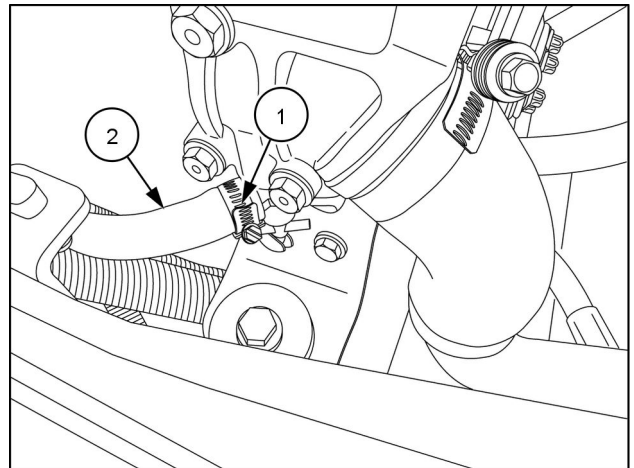
21. Drain cooling system.

22. Disconnect coolant quick fill hose from lower radiator pipe. Cap and plug all openings to prevent fluid loss or contamination.



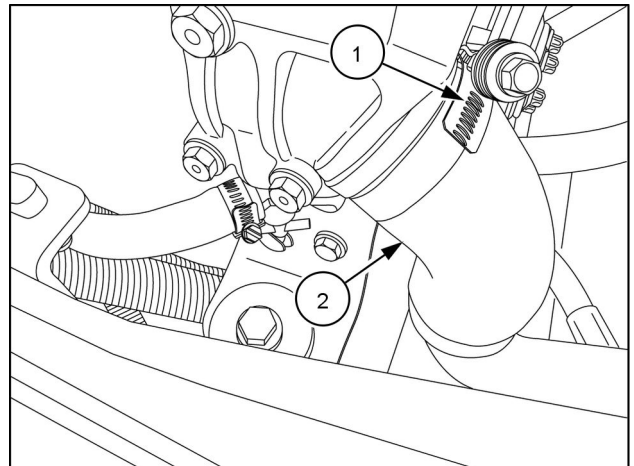
RAIL13DOZ1322AA 15

23. Loosen hose clamp (1) and disconnect the cab heater hose (2) from the engine. Cap and plug all openings to prevent fluid loss or contamination.



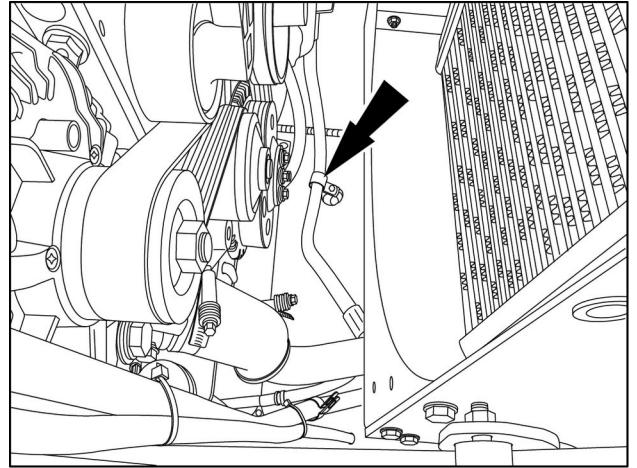
RAIL13DOZ1444AA 16

24. Loosen hose clamp (1) and disconnect the lower radiator hose (2) from the engine. Cap and plug all openings to prevent fluid loss or contamination.



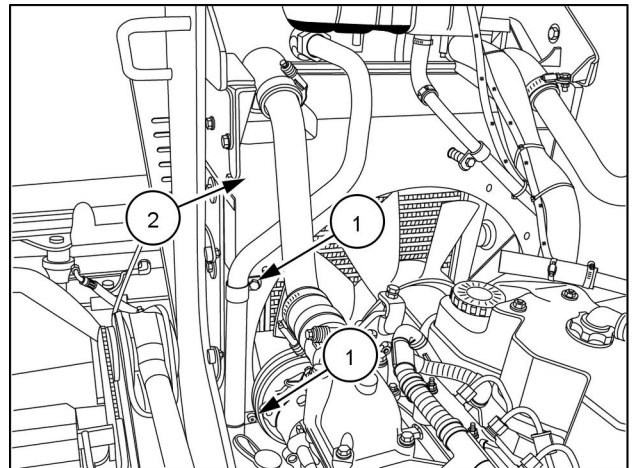
RAIL13DOZ1444AA 17

25. Remove bolt and washer from coolant quick fill hose retaining clamp.



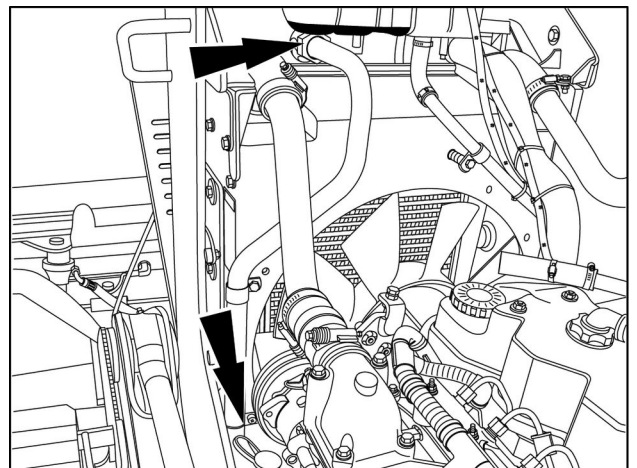
RAIL13DOZ1329AA 18

26. Remove two bolts and washers from retaining clamps (1) securing the upper hydraulic oil cooler pipe to the fan shroud (2).



RAIL13DOZ1325AA 19

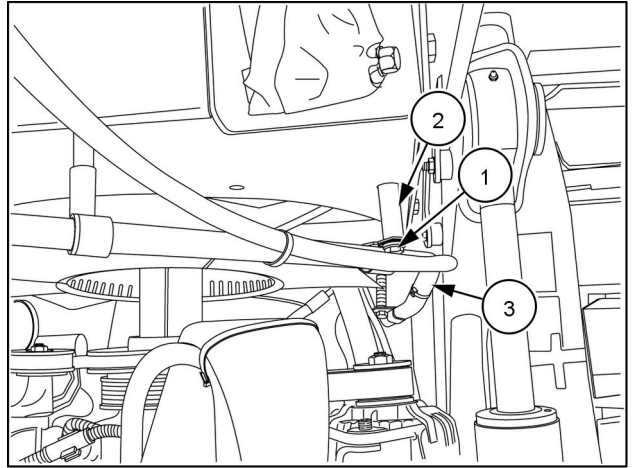
27. Apply a vacuum to the hydraulic system.
28. Disconnect the upper hydraulic oil cooler pipe from hydraulic oil cooler and lower hydraulic hose. Remove the pipe from the machine. Cap and plug all openings to prevent fluid loss or contamination.



RAIL13DOZ1325AA 20

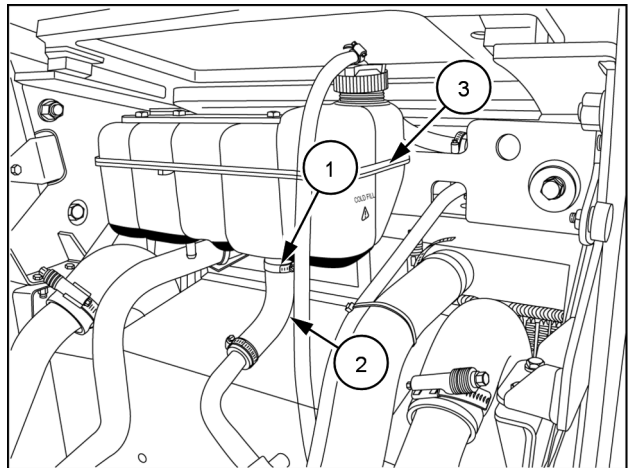
29. Remove the vacuum from the hydraulic system.

30. Remove three mounting bolts (1) and spacers (2) from coolant fill pipe (3) retaining clamps.



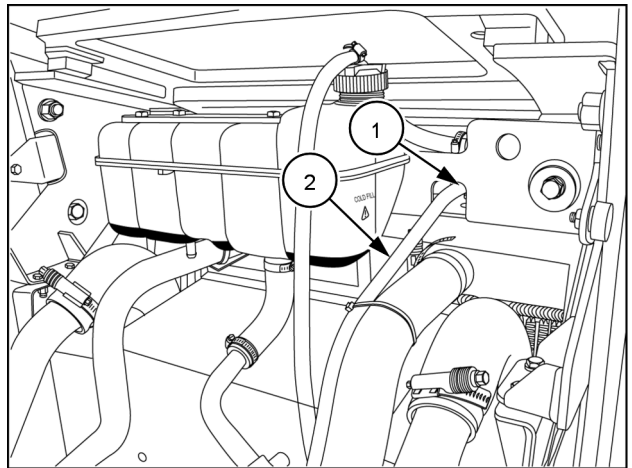
RAIL13DOZ1328AA 21

31. Loosen clamp (1) and disconnect coolant fill pipe (2) from the surge tank (3). Cap and plug all openings to prevent fluid loss or contamination.



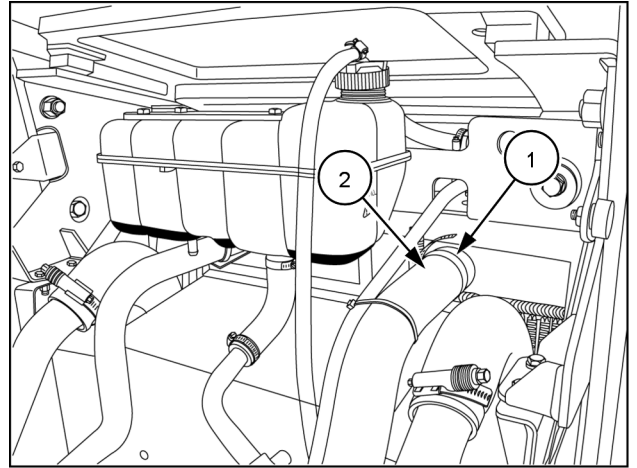
RAIL13DOZ1390AA 22

32. Loosen cooling system air bleed hose clamp (1). Remove coolant air bleed hose (2) from the top of the radiator. Cap and plug all openings to prevent fluid loss or contamination.



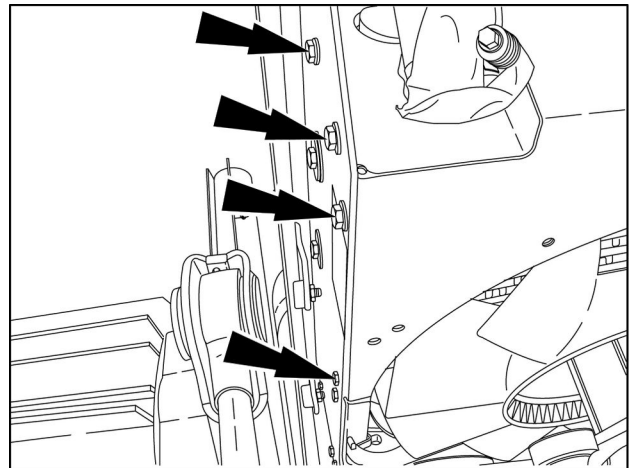
RAIL13DOZ1390AA 23

33. Loosen upper radiator hose clamp (1) and disconnect upper radiator hose (2) from the radiator. Cap and plug all openings to prevent fluid loss or contamination.



RAIL13DOZ1390AA 24

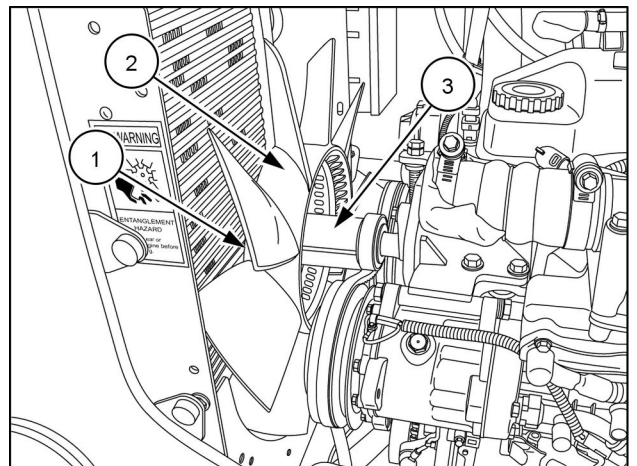
34. Remove eight mounting bolts and washers from the upper fan shroud. Remove the fan shroud from the machine.



RAIL13DOZ1408AA 25

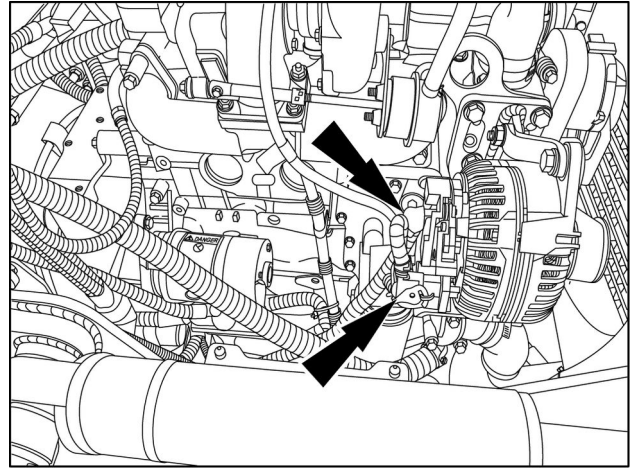
NOTE: Note the orientation of the fan blade for aid in installation.

35. Remove four fan blade mounting bolts and washers (1), fan blade (2), and spacer (3) from the engine.



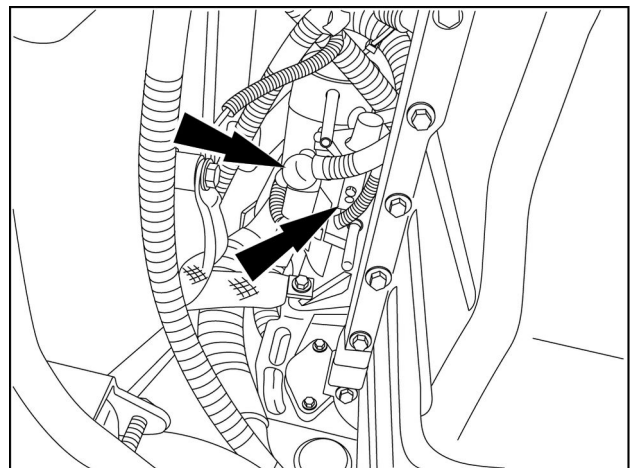
RAIL13DOZ1439AA 26

36. Disconnect all electrical connectors from the alternator. If necessary, remove cable ties.



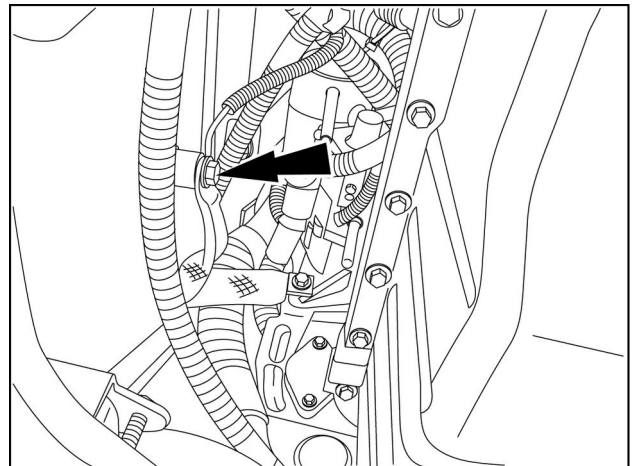
RAIL13DOZ1330AA 27

37. Disconnect all electrical connections from the starter.



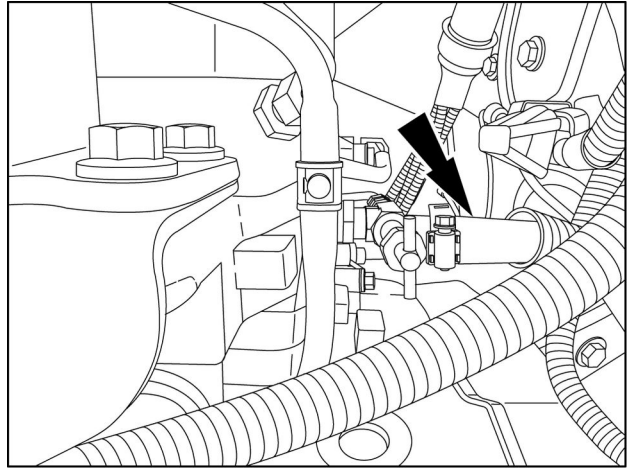
RAIL13DOZ1324AA 28

38. Remove bolt and disconnect the ground cable from the machine frame.



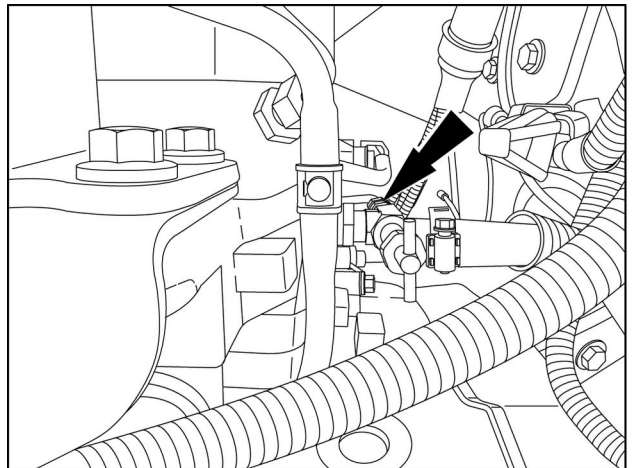
RAIL13DOZ1324AA 29

39. Loosen clamp and disconnect cab heater hose from the rear of the engine. Cap and plug all openings to prevent fluid loss or contamination.



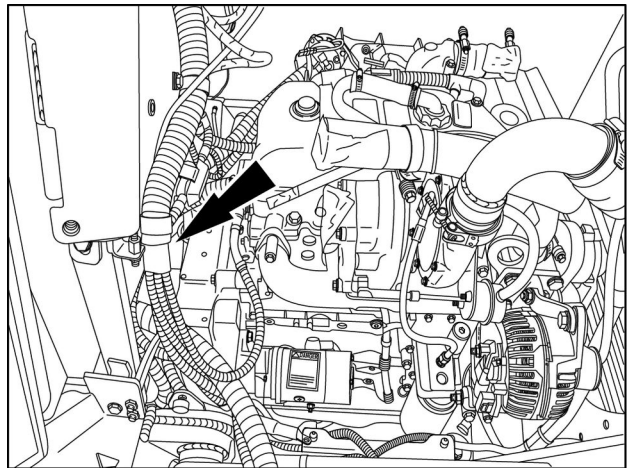
RAIL13DOZ1445AA 30

40. Loosen clamp and disconnect DEF tank heater hose from the rear of the engine. Cap and plug all openings to prevent fluid loss or contamination.



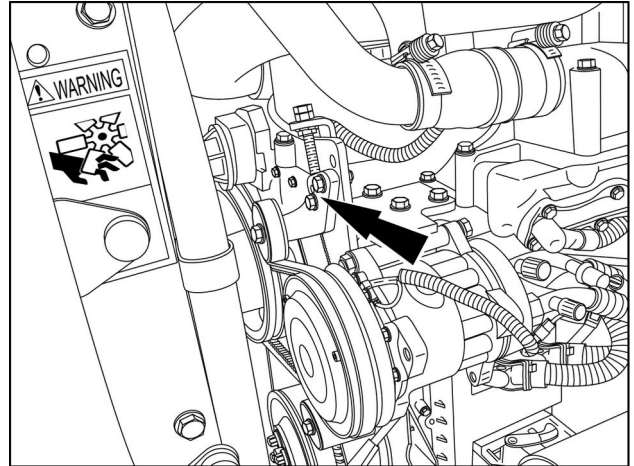
RAIL13DOZ1445AA 31

41. Remove two battery cable retaining clamp bolts and washers from the rear of the engine.



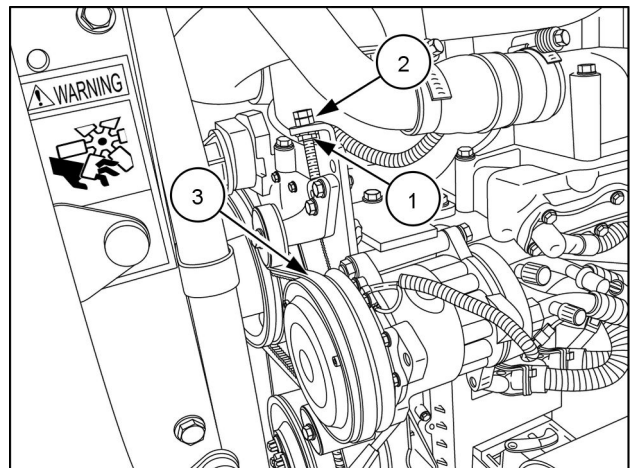
RAIL13DOZ1331AA 32

42. Loosen two A/C compressor belt tensioner mounting bolts.



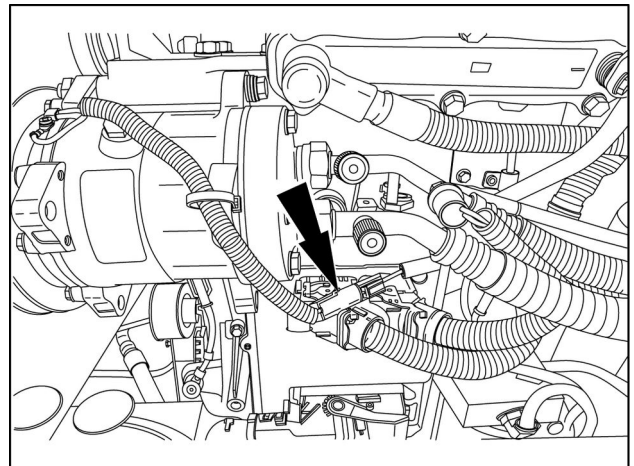
RAIL13DOZ1371AA 33

43. Loosen A/C compressor belt tensioner bolt jam nut (1) and loosen tensioning bolt (2). Remove the A/C compressor belt (3) from the machine.



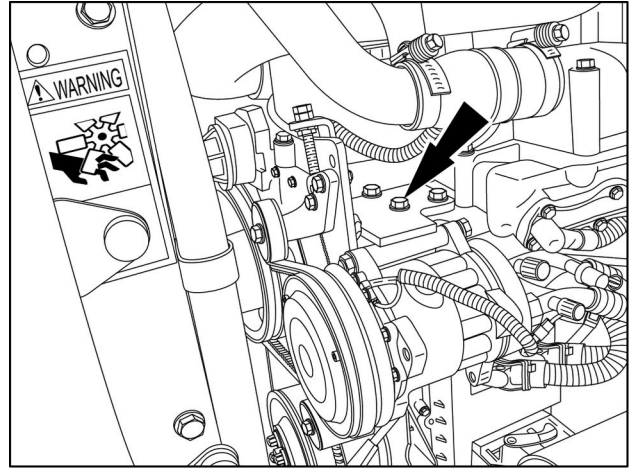
RAIL13DOZ1371AA 34

44. Disconnect the electrical connector from the A/C compressor.



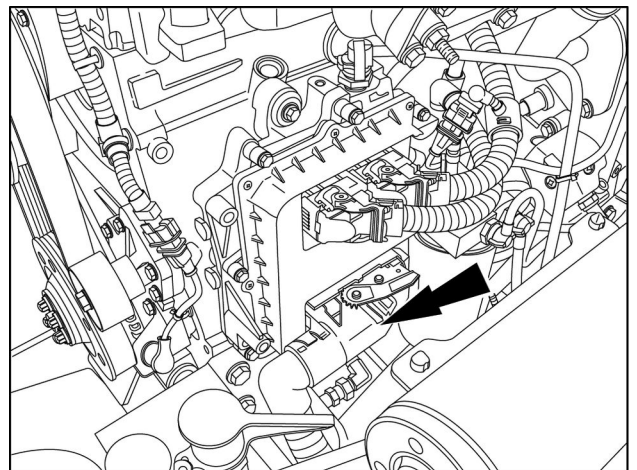
RAIL13DOZ1392AA 35

45. Remove three A/C compressor bracket mounting bolts and washers. Remove A/C compressor with mounting bracket from the engine. Set to the side.



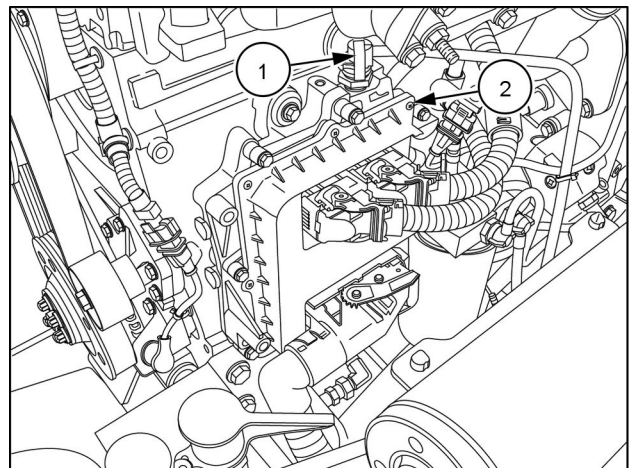
RAIL13DOZ1371AA 36

46. Disconnect the lower electrical connector from the ECU.



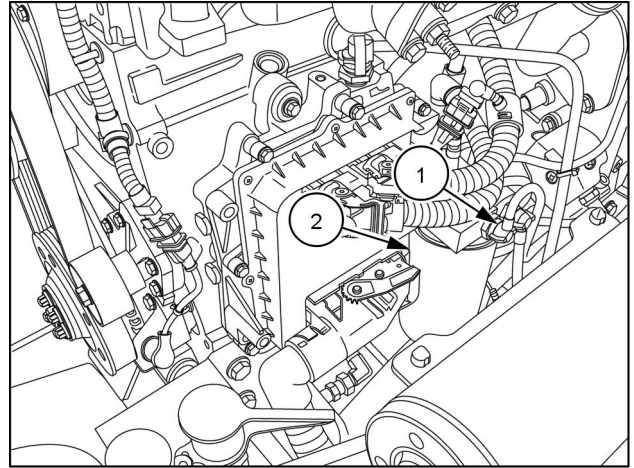
RAIL13DOZ1337AA 37

47. Disconnect the fuel supply hose (1) from the fuel cooler (2). Cap and plug all openings to prevent fluid loss or contamination.



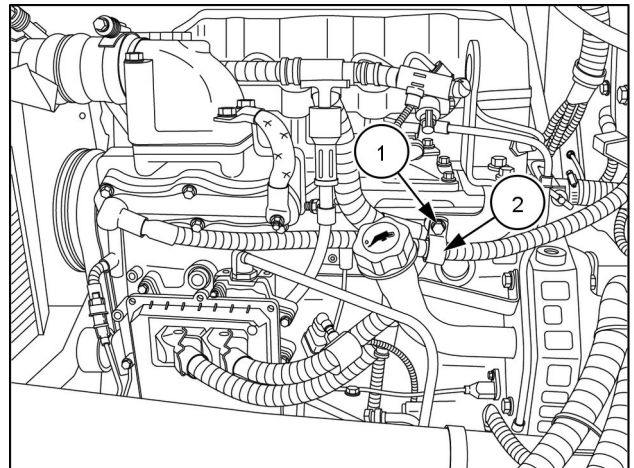
RAIL13DOZ1337AA 38

48. Disconnect the fuel return hose **(1)** from the fuel filter **(2)**. Cap and plug all openings to prevent fluid loss or contamination.



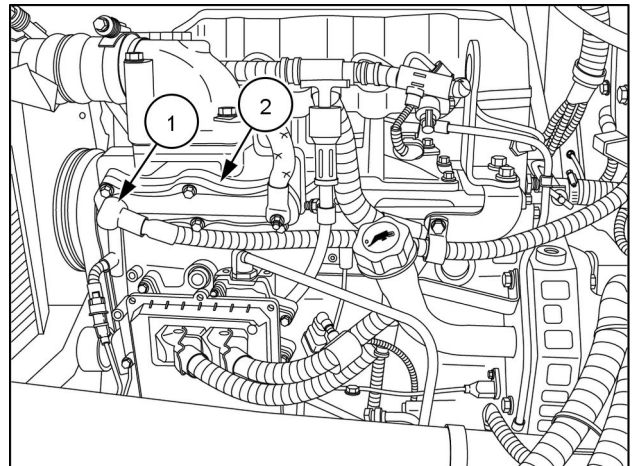
RAIL13DOZ1337AA 39

49. Remove bolt and washer **(1)** from the positive (+) air intake heater cable retaining clamp **(2)**.



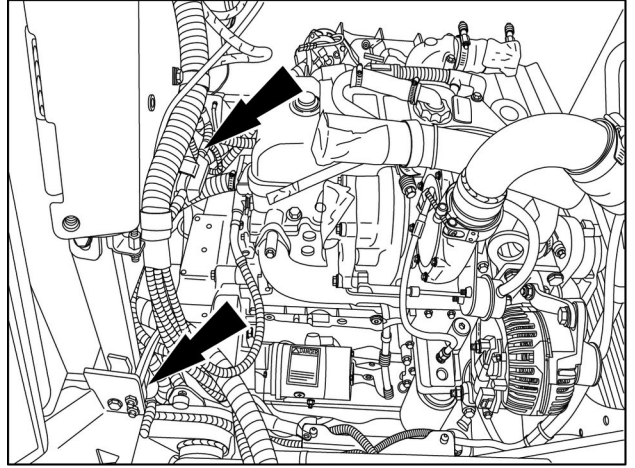
RAIL13DOZ1336AA 40

50. Disconnect the positive (+) air intake heater cable **(1)** from the air intake heater **(2)**.



RAIL13DOZ1336AA 41

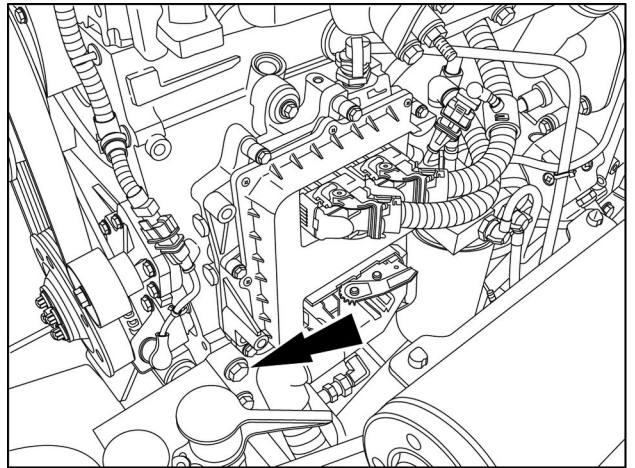
51. Disconnect two angle cylinder hydraulic hoses above the right and left rear engine mounts. Cap and plug all openings to prevent fluid loss or contamination.



RAIL13DOZ1331AA 42

NOTE: Quick fill bracket is removed to aid in accessing the left front engine mounting bolt.

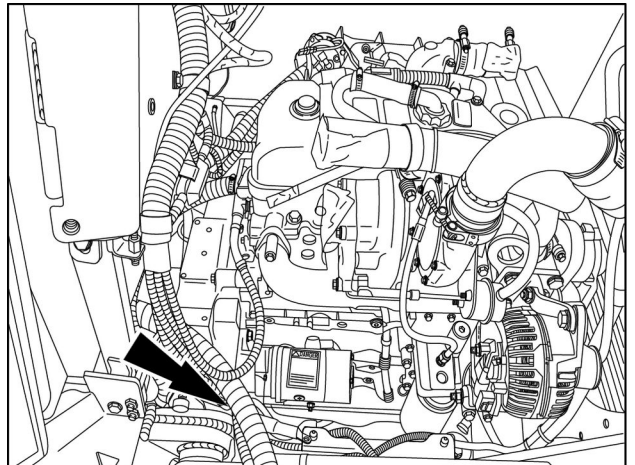
52. Remove three bolts and washers from the quick fill hose bracket. Set to the side.



RAIL13DOZ1337AA 43

NOTE: DEF hose loom clamp is removed for right rear engine mount clearance during engine removal.

53. Remove DEF hose loom retaining clamp bolt and washer from the frame.



RAIL13DOZ1331AA 44



Suggest:

If the above button click is invalid.

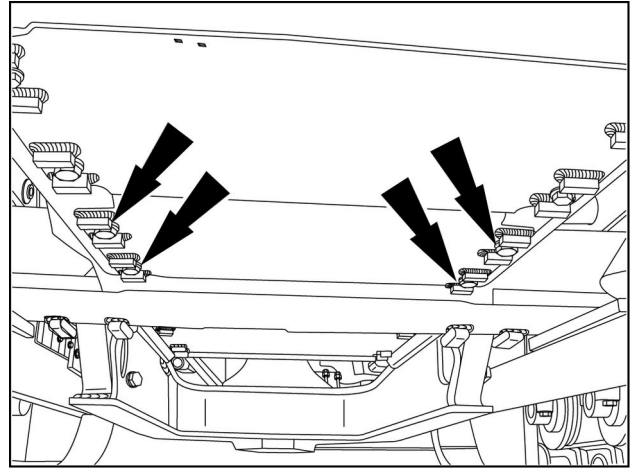
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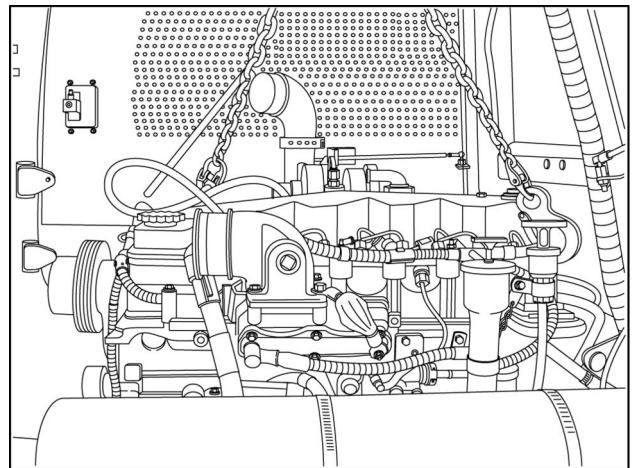
54. Remove middle front belly pan.



RAIL13DOZ0373AA 45

NOTICE: Engine weighs approximately **544 kg (1200 lb)**. Use appropriate lifting equipment to prevent personal injury or property damage.

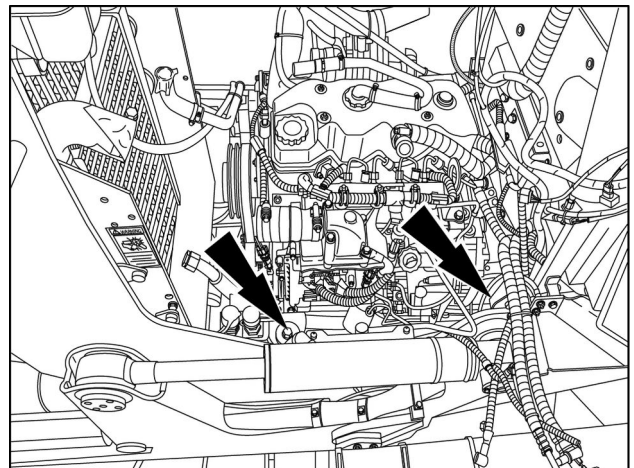
55. Attach an appropriate lifting device to the engine.



RAIL12DOZ0713BA 46

NOTE: Note the location of the front and the rear engine mount spacers to aid in engine installation.

56. Remove four engine mounting nuts, and bolts, six washers, and four spacers.



RAIL13DOZ1339AA 47

57. Raise the engine from the engine mounts. Move the engine slightly toward the front of the machine to disengage the hydrostatic pump driveshaft from the hydrostatic pump. Remove the engine from the machine.

NOTICE: **544 kg (1200 lb)**. Use appropriate supporting equipment to prevent personal injury or property damage.

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